REMARKS

The office action issued by the Examiner and the citations referred to in the office action have been carefully considered.

Specification

A substitute abstract is presented herewith.

Other errors that may have arisen from a copy of the WIPO publication previously submitted need to be addressed prior to allowance of the present application. A telephonic conference is hereby requested prior to mailing of a Notice of Allowance to address such issues.

Rejections under 35 U.S.C. §102

Claims 15, 19-20, 24 and 26-28 were rejected under 35 U.S.C. 102(b) as being anticipated by Clawson et al. (US 6,083,425).

Clawson Does Not Disclose Zones of a Single Chamber

The Office Action states: "Examiner respectfully disagrees and points out that the reaction stages (28, 66, 84) of Clawson are positioned in *a hydrogen reactor chamber* (Fig. 1, 12), as instantly claimed."

However, claim 15 recites a single hydrogen reactor chamber forming "a series of distinct zones or portions." This series of distinct zones or portions are part of the single hydrogen reactor chamber, rather than each forming distinct chambers of its own.

The Specification gives meaning to the term "zone or portion" by clarifying what constitutes a zone boundary:

> Zones boundaries may vary. Zone boundaries may be characterized by an abrupt end to the catalysts, may be characterized by a decreasing or increasing gradient of one or more catalysts or catalytic activity, or may be characterized by any combination thereof. [Specification 0013].

Thus, a zone is not defined by a physical partition, as with the separate chambers of Clawson. Rather, zones are defined by the catalysts contained therein. Where the zones are part of a single hydrogen reactor chamber, as with claim 15, boundaries are defined only by the catalysts rather than physically partitioned spaces.

As shown in Figure 2 of the present application, hydrogen reactor chamber 99 contains zones 200, 202, and 204. It is clear that the zones are part of a single, contiguous chamber, as further shown in Figure 3. The Specification discloses:

> Block 100 includes a staged catalyst medium wherein catalysts possessing unique distinctive characteristics are disposed in zones identified with numerals 200 202 and 204. Catalyst loading in zones 200 202 and 204 is accomplished utilizing a plurality of catalyst powders within the hydrogen reactor chamber, wherein each of the plurality of catalyst powders possesses unique definitive characteristics, packed in the reactor such as to provide a staged catalyst medium through which the feed stream of hydrocarbons is passed, to liberate hydrogen. [Specification 0078].

Thus, the separate chambers of Clawson cannot satisfy the zones of a single chamber as recited in claim 15.

Clawson Does Not Disclose A High-Activity Steam Reformation Catalyst

The Office Action asserts that "Clawson's high activity steam reformation catalyst (66) is the same as the instantly claimed high-activity steam reformation catalyst" and that "irrespective of the 'name' given to the catalyst, and given the above, the modified catalyst (66) of Clawson will perform the same as the instant high activity steam reformation catalyst."

Applicant submits that the limitation of a high-activity steam reformation catalyst is more than merely a name. Claims are limited by the language thereof, including names given to distinct limitations, as well as the plain meaning thereof. The plain meaning of the term "steam reformation catalyst" cannot be so easily dismissed in order to reject the claim over a different type of catalyst.

Those having ordinary skill in the art recognize the difference between a steam reformation catalyst and a water-gas shift catalyst. Applicant submits Clawson as evidence of this very point. Clawson, itself, demonstrates that such a difference between catalysts exists by designating a steam reforming catalyst 28 as a distinct and separate type of catalyst relative to high temperature shift catalyst 66 and low temperature shift modifying catalyst 84. Had Clawson intended element 66 to be a steam reforming catalyst, as with its steam reforming catalyst 28, it would have so designated it. Instead, Clawson designates both element 66 and element 84 as distinct shift catalysts.

That steam reformation catalysts and shift catalysts have some common elements is axiomatic. They are both catalysts. However, similarities construed at such high levels of abstraction cannot overcome the inherent and express differences recognized by artisans.

With regard to high temperature shift catalyst 66 of Clawson, the Office Action states: "it is a supported nickel-based catalyst". This appears to be related to the rejection of claim 19, in which the Office Action states: "With respect to claim 19, Clawson teaches wherein said high-activity steam reformation catalyst (66) is a supported nickel-based catalyst/(transition metal oxides supported on a perforated plate (70)) (col. 4, lines 32-58)." Here, the Office Action mischaracterizes Clawson. Clawson never mentions nickel with respect to high temperature shift catalyst 66. Rather, Clawson discloses the following:

> A high temperature shift zone 64 is annularly located between the second vessel 58 and the reformer vessel 12 and includes a high temperature shift catalyst 66. An example of a suitable high temperature shift catalyst 66 are those that are operable at a temperature in the range of between about 300° C. and about 600° C. Preferably the high temperature shift catalyst 66 includes transition metal oxides, such as ferric oxide ($Fe_2 O_3$) and chromic oxide ($Cr_2 O_3$). Other types of high temperature shift catalysts include iron oxide and chromium oxide promoted

> with copper, iron silicide, supported platinum, supported palladium, and other supported platinum group metals, singly and in combination. The high temperature shift catalyst 66 is held in place by a perforated plate 68 and a perforated plate 70. Gas can pass through the high temperature shift zone 64 through the perforated plate 70 to a sulfur removal zone 71. [Clawson, col. 4, lines 43-58].

While nickel may be considered a transition metal, one having ordinary skill in the art could not have been expected to readily separate nickel from among the laundry list of over 60+ elements that are within the broad group of "transition metals." It must be noted that Clawson does call out particular transition metals and metal oxides without any mention of nickel with respect to high temperature shift catalyst 66.

To further illustrate the difference between steam reformation catalysts and shift catalysts, Clawson **does** recite nickel with respect to steam reforming catalyst 28. This emphasizes the distinction between catalysts for steam reformation and catalysts for water-gas shift reactions as evidenced by Clawson.

Because *Clawson* fails to teach or suggest a high-activity steam reformation catalyst of a supported nickel-based catalyst, it is respectfully submitted that *Clawson* fails to teach each and every element of claim 15. As such, it is respectfully submitted that claim 15 and its respective dependent claims are not anticipated by the teachings of *Clawson*, and reconsideration is respectfully requested.

Furthermore, while operational conditions are not relied upon to give the claims meaning, inherent in the plain meanings of a "steam reformation catalyst" and a "shift catalyst" are that the respective catalysts are configured to facilitate separate and distinct processes. As such, each has a disparate configuration such that each imparts its designated function under a distinct set of conditions. For example, the disclosure of Clawson states:

> The heated reformate stream exits the second vessel outlet 62 to the flow distribution zone 63, where it has been cooled to a temperature of between about 300° C. and about 600° C. and is directed through the perforated plate 68 to the high temperature shift zone 64 where essentially all of the carbon monoxide is removed or reduced by contacting the heated reformate stream with the high

> temperature shift catalyst 66 at a temperature in the range of between about 300° C. and 600° C. [Clawson, col. 6, lines 31-39].

Clawson clearly delineates between the two distinct processes. As such, one having ordinary skill in the art would not have interpreted the high temperature shift catalyst 66 of Clawson to include a high-activity steam reformation catalyst.

Because *Clawson* fails to teach or suggest both a high-activity steam reformation catalyst and a coke-resistant steam reformation catalyst, it is respectfully submitted that *Clawson* fails to teach each and every element of claim 15. As such, it is respectfully submitted that claim 15 and its respective dependent claims are not anticipated by the teachings of *Clawson*, and reconsideration is respectfully requested.

It is noted that in order to overcome an anticipation rejection, it must only be demonstrated that the references cited fail to teach each and every claim limitation. *See Verdegaal Bros. v. Union Oil Co. of California,* 814 F.2d 628, 631 (Fed. Cir. 1987). Because *Clawson* fails to teach or suggest the claimed plurality of steam reformation catalysts in the claimed configuration, it is respectfully submitted that *Clawson* fails to teach each and every element of claim 15. As such, it is respectfully submitted that claim 15 and its respective dependent claims are not anticipated by the teachings of *Clawson*, and reconsideration is respectfully requested.

Rejections under 35 U.S.C. §103

Claims 17 and 21-23 were rejected under 35 U.S.C. 103(a) as obvious over Clawson et al. (US 6,083,425), as applied to claim 15 and 20 above, and further in view of Lomax, JR. et al. (US 2002/0146359).

It would be incumbent upon Lomax to remedy the deficiencies of Clawson with respect to the pending claims, as discussed above. However, Applicant respectfully submits that Lomax does not satisfy the limitations discussed above. Accordingly, as claims 17 and 21-23 depend

from claim 15, Applicant respectfully submits that claims 17 and 21-23 are patentable for at least the same reasons presented above with respect to claim 15. Reconsideration is kindly requested.

Claim 25 was rejected under 35 U.S.C. 103(a) as obvious over Clawson et al. (US 6,083,425), as applied to claim 15 above, and further in view of Korotkikh et al. (US 2003/00464887).

It would be incumbent upon Korotkikh to remedy the deficiencies of Clawson with respect to the pending claims, as discussed above. However, Applicant respectfully submits that Korotkikh does not satisfy the limitations discussed above. Accordingly, as claim 25 depends from claim 15, Applicant respectfully submits that claim 25 is patentable for at least the same reasons presented above with respect to claim 15. Reconsideration is kindly requested.

It is respectfully submitted that all of the Examiner's objections have been successfully traversed and that the application is now in order for allowance. Accordingly, reconsideration of the application and allowance thereof is courteously solicited.

The Director is authorized to charge any additional fee(s) or any underpayment of fee(s), or to credit any overpayments to **Deposit Account Number 50-2298**. Please ensure that Attorney Docket Number 37929-32102 is referred to when charging any payments or credits for this case.

Respectfully submitted,

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